Claims

What is claimed is:

1.   Method for calculating a position of a mobile
      communications equipment, by

            receiving physical communication channels
            within the mobile communications equipment,

            receiving first signal codes within said
            physical communication channels,

            measuring a signal phase of said first signal
            code within said mobile communications
            equipment,

            measuring a carrier signal within said
            physical communications channels within said
            mobile communications equipment,

            reducing a noise level of said measured
            signal phase by using said carrier signal,
            and

            calculating said position of said mobile
            communications equipment using at least said
            noise level reduced signal phase.

2.   The method of claim 1, wherein said signal phase
      is a signal code phase.

3.   The method of claim 2, wherein said noise level of said measured signal code phase is reduced by filtering with said carrier signal.

4.   The method of claim 1, wherein said carrier signal is obtained from a measured frequency shift.

5.   The method of claim 4, wherein said measured frequency shift is a pseudodoppler frequency.

6.   The method of claim 1, wherein said carrier signal is obtained from an accumulated carrier phase measurement.

7.   The method of claim 3, wherein said filtering is done by carrier smoothing.

8.   The method of claim 2, wherein a threshold value for estimating said signal code phase is defined.

9.   The method of claim 2, wherein the phase of said first signal code phase is tracked and said carrier signal is obtained from a carrier and/or phase tracking loop.

10.   The method of claim 1, wherein said carrier signal is obtained from matched filter outputs within said mobile communications equipment.

11.   The method of claim 1, wherein said physical communication channels are transmitted from ground based base stations.

12.   The method of claim 1, wherein said signal phase
       is transmitted from said mobile communications
       equipment to a base station.

13.   The method of claim 1, wherein said measured
       carrier signal is transmitted from said mobile
       communications equipment to said base station.

14.   The method of claim 1, wherein said position is
       calculated within an underlying communications
       network.

15.   The method of claim 1, wherein said position is
       calculated using a time of arrival calculation
       principle.

16.   The method of claim 1, wherein said position is
       calculated using a time difference of arrival
       calculation principle.

17.   The method of claim 1, wherein at least position
       information of said base station are transmitted
       from said base station to said mobile
       communications equipment.

18.   The method of claim 1, wherein said signal code is
       a pilot signal code.

19.   The method of claim 1, wherein said base station
       and said mobile equipment utilize a code division
       multiple access communication protocol.

20.   The method of claim 1, wherein said position is
       calculated using a hybrid position calculation.

21. Method for calculating a position of a mobile phone using advanced forward link trilateration, by

receiving physical communication channels within the mobile communications equipment,

receiving first signal codes within physical communication channels,

measuring a pilot signal code phase of said first signal code within said mobile communications equipment,

measuring a frequency shift within said physical communications channels within said mobile communications equipment,

smoothing said pilot signal code phase by using said measured frequency shift, and calculating said position using at least said smoothed pilot signal phase.

22. Mobile communications equipment comprising

reception means for receiving physical communication channels,

a first signal processor for measuring a signal phase of a first signal code within said physical communication channels,

a second signal processor for calculating a
carrier signal within said physical
communications channels, and

calculation means for calculating a noise
level reduced signal phase by using said
carrier signal.

23. The mobile communications equipment of claim 22,
wherein said calculation means provide reducing
noise level of said measured signal code phase by
filtering with said carrier signal.

24. The mobile communications equipment of claim 22,
wherein said second signal processor provides
obtaining the carrier signal from a measured
frequency shift.

25. The mobile communications equipment of claim 22,
wherein said calculation means provide filtering
said signal code phase with said carrier signal by
carrier smoothing.

26. The mobile communications equipment of claim 22,
wherein said second signal processor provides
matched filters for calculating said carrier
signal.

27. The mobile communications equipment of claim 22,
comprising communication means for transmitting
said signal code phase from said mobile
communications equipment to a base station.

28.   The mobile communications equipment of claim 22,
comprising communication means for transmitting
said measured carrier signal from said mobile
communications equipment to a base station.

29.   The mobile communications equipment of claim 22,
comprising calculation means for calculating said
position using a hybrid position calculation.

30.   Mobile communications equipment comprising

reception means for receiving physical
communication channels,

a first signal processor for measuring a
signal phase of a first signal code within
said physical communication channels,

a second signal processor for calculating a
pseudodoppler frequency within said physical
communications channels,

calculation means for calculating a noise
level reduced signal phase by using said
pseudodoppler frequency, and

position calculation means for calculating
said position using at least said noise level
reduced signal phase.

31.   System for calculating a position of a mobile
communications equipment comprising

at least one ground based base station

providing physical communication channels
comprising a first signal code,

at least one mobile communications equipment,
wherein said mobile communications equipment
comprises

a first signal processor for measuring a
signal phase of a first signal code within
said physical communication channels,

a second signal processor for calculating a
carrier signal within said physical
communications channels, and

calculation means for calculating a noise
level reduced signal phase by using said
carrier signal.

32.   Computer program for calculating a position of a

mobile communications equipment, operable to
cause a processor to

receive physical communication channels within
the mobile communications equipment,

receive first signal codes within said
physical communication channels,

measure a signal phase of said first signal
code within said mobile communications
equipment,

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measure a carrier signal frequency within said physical communications channels within said mobile communications equipment, and

reduce a noise level of said measured signal phase by using said carrier signal frequency.

33.   A computer program product comprising a computer program of claim 32.

33.   Module in communication with reception means of a mobile communication equipment, comprising

a first signal processor for measuring a signal phase of a first signal code within said physical communication channels,

a second signal processor for calculating a carrier signal within said physical communications channels, and

calculation means for calculating a noise level reduced signal phase by using said carrier signal.